The NASA
LangleyEdge
NASA LANGLEY RESEARCH CENTER

NASA Langley Research Center is actively seeking partnerships and collaborations to commercialize its Low-Noise Fan Exit Guide Vane technology.

The Market Opportunities

This technology has the potential for reducing a significant source of engine noise produced as a result of fan wake perturbations impinging on exit guide vanes. The technique attenuates broadband noise rather than specific frequencies and harmonics. It is suited for manufacturers of jet engines. The development has resulted from a cooperative effort in NASA's noise reduction program between NASA- Langley, NASA-Glenn, NASA-Ames, FAA, small businesses, and universities.

Non-turbofan applications include helicopter blade slap and ship and submarine propeller noise.

The Benefits

- Attenuates broadband noise rather than selected frequency noise
- Compatible with other noise reduction technologies
- Retrofit into existing engine designs will not compromise mechanical integrity or performance

The Technology

Fan exit guide vanes are used in turbojet engines to provide flow direction control. As the mean flow passes through the fan, the rotation of the fan causes the exiting flow to contain swirl. Vanes are placed downstream of the fan to remove this swirl such that the flow is straightened and the engine can operate at peak efficiency. Swirling flow impinging on the surface of the vanes, however, causes unwanted noise to be created. Some of the

Low-Noise Fan Exit Guide Vanes

Reduction of rotor/stator interaction noise generated from wakes

noise is tonal in nature and related to the rotational rate of the fan blades. Depending on the aero acoustic environment, this noise may be unacceptably high. The interaction of the turbulence in the flow exiting the fan with the guide vanes causes broadband noise.

This invention provides an acoustically treated vane that inhibits sound generation caused by impingement of fluctuating pressures on the surface of the vane. Noise is reduced by incorporating a porous sheet on the surface of the vanes and multiple separate chambers to house acoustic modifiers within the vanes interior. The modifiers help mitigate fluctuating pressures on the surface of the vane thereby decreasing the level of noise. Additionally, the chambers can be designed to attenuate specific ranges of frequencies thereby inhibiting fluctuating pressures over a wide range of frequencies.

Additional Information

To discuss in detail how this technology can profit you and your business, please contact:

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